U.S.
DEPARTMENT
OF AGRICULTURE—
FOREST SERVICE
NORTHEASTERN AREA, STATE AND
PRIVATE FORESTRY—UPPER DARBY, PA. 19082

SB
763
.N81
F76
1975

'75 forest pest conditions in the north east

Appreciation is extended to all the State agencies whose assistance and cooperation made this report possible.

Cover Photos:

Top: Spruce budworm larva

Red Pine infected with:

Middle Left: *Scleroderris lagerbergii*

Middle Right: *Sirococcus strobilinus*

Bottom: Gypsy moth larva

March 1976

FOREST PEST CONDITIONS IN THE NORTHEAST '75

by

J. B. Hanson, W. H. Hoffard, and P. W. Orr

CONTENTS

CONDITIONS IN BRIEF 3
STATUS OF INSECTS 5
Spruce budworm 3
Fall and spring cankerworms 6
Gypsy moth 7
Archips semiferanus 10
Oak leaftier 7
Jack pine budworm 10
Forest tent caterpillar 10
Oak leaf roller 10
Large aspen tortrix 11
Fall webworm 11
Arborvitae leafminer 11
Larch sawfly 11
Larch casebearer 12
Red pine scale 12
White pine weevil 12
Pine root collar weevil 12
Conifer sawflies 13
Bark beetles 13
Spittlebugs 13
Miscellaneous insects 14
STATUS OF DISEASES 16
Birch leafminer 16
Elm leaf beetle 16
Locust leafminer 16
Maple leafcutter 16
Oak wilt 16
Dutch elm disease 17

Cytospora canker 17
Dipolodia tip blight 17
Chestnut blight 17
Nectria canker 18
Septoria leaf spot 18
Butternut dieback and canker 18
Scleroderris canker 18
Dwarfmistletoe 18
Anthracnose 19
White pine blister rust 19
Red pine shoot blight 19
Beech bark disease 19
White pine root decline 20
Brown spot needle blight 20
Verticillium wilt 20
Lophodermium needle cast 20
Mycorrhizae 21
Sweetfern rust 20
Pine seedling mortality 20
Phytophthora root rot 20
ATMOSPHERIC POLLUTANTS 21
ANIMAL DAMAGE 22
PHYSIOLOGICAL DISORDERS 22
SUMMARY 22

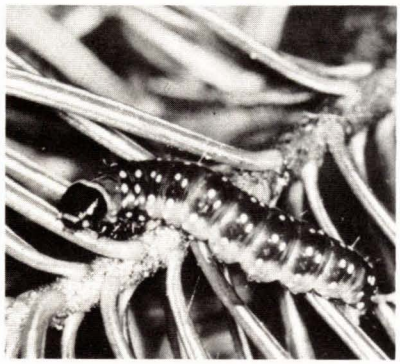
CONDITIONS IN BRIEF

Spruce budworm larva

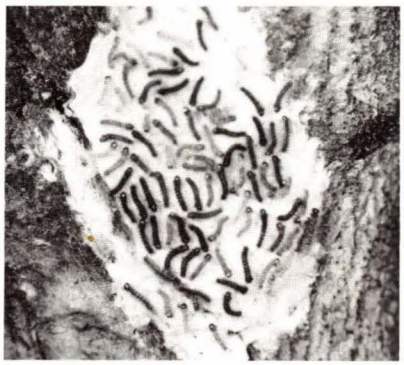
The spruce budworm caused the most damage in the 20-State Northeastern Area. Defoliation of more than five million acres in 1974 prompted a 2.2 million acre aerial chemical control project in Maine during 1975, the largest state-federal forest spraying project in U.S. history. Acreage defoliated by the gypsy moth dropped off sharply during this period, especially in New England and New York. The 91,000 acres damaged in those two states represents only about 60 percent of the 1974 toll. Fall canker-worm outbreaks occurred throughout the northeast, especially in Pennsylvania, New York and Wisconsin, where over 750,000 acres were defoliated. The oak leaf roller outbreak, which began about eight years ago, is declining in Pennsylvania. Populations of the oak leaf tier complex also appear to be on the decline. In the Lake States, defoliation of jack pine budworm dropped sharply, with Michigan reporting only 35,000 acres of light to moderate defoliation. Forest tent caterpillar outbreaks developed in Michigan, with over 200,000 acres of oak and aspen being defoliated (see Table 1).

Among diseases, oak wilt incidence was static to slightly higher. The Huron-Manistee National Forest reported damage by oak wilt for the first time, while losses in state parks seemed to intensify. Further south, in Missouri and Iowa, there was little change in the oak wilt problem. Dutch elm disease incidence increased, especially in the Lake States, and heavy mortality is expected in northern sections of Minnesota, Wisconsin and Michigan in 1976. Losses from beech bark disease are increasing, with mortality in New York's Catskill and Adirondack areas especially high. Vermont and

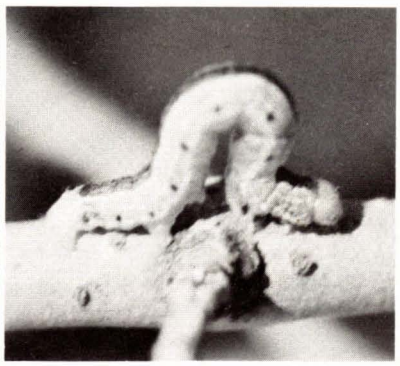
New Hampshire report high beech mortality in places where that species is a major stand component. Reports of sulfur dioxide and ozone damage were wide-spread and numerous. White pine in the Lake States was especially affected.



Spruce budworm larva



Gypsy moth larvae



Fall cankerworm larva

TABLE 1—Extent of Major Defoliator Outbreaks in the Northeast-1975

	INSECT			
STATE	SPRUCE BUDWORM	GYPSY MOTH	CANKERWORM COMPLEX	TOTALS
Connecticut		63,411		63,411
Maine	7,000,000	110		7,000,110
Massachusetts		17,900		17,900
Michigan	166,200			166,200
Minnesota	105,000			105,000
New Jersey		55,400		55,400
New York		9,275	93,000	102,275
Pennsylvania		317,800	362,000	679,800
Rhode Island		435		435
Vermont		30		30
West Virginia			3,000	3,000
Wisconsin	60,000		300,000	360,000
TOTALS	7,331,200	464,361	758,000	8,553,561[1]

1 Includes all noticeable defoliation. It is assumed that this defoliation is in the moderate to heavy category.

STATUS OF INSECTS

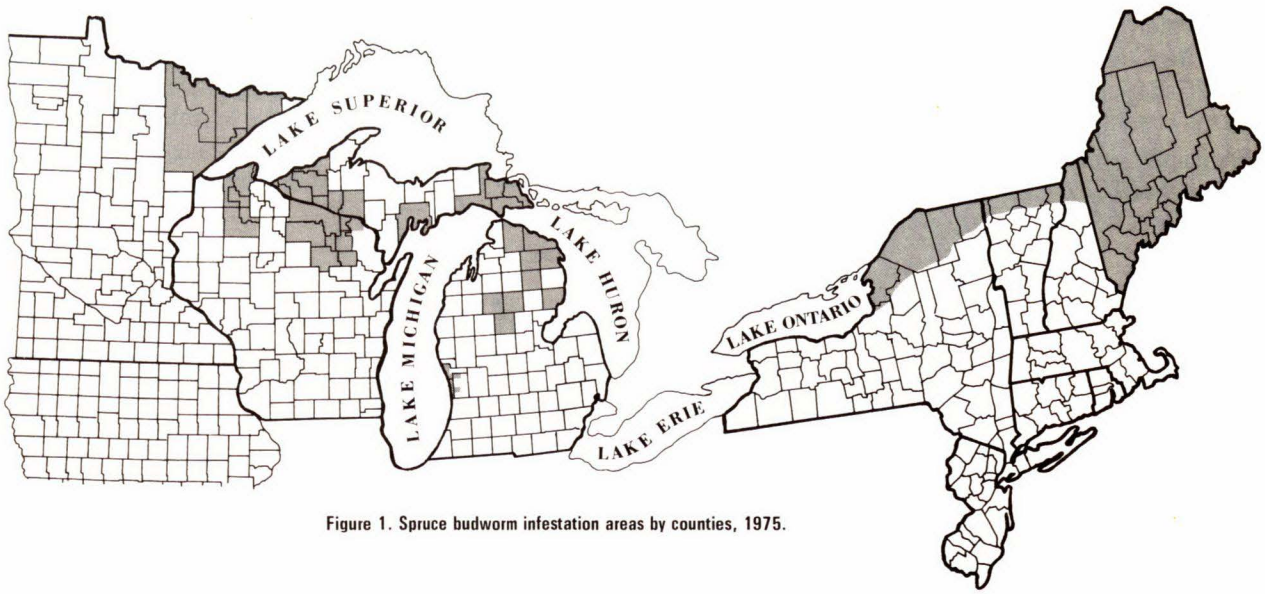


Figure 1. Spruce budworm infestation areas by counties, 1975.

SPRUCE BUDWORM,
Choristoneura fumiferana (Clemens)

This pest continued in 1975 as the most serious conifer defoliator in the Northeastern Area. In Maine, almost all spruce-fir types, seven million acres, suffered moderate to severe defoliation. New York expects approximately 5,000 acres of heavy defoliation in 1976. Elsewhere in the northeast, the budworm populations, which were expected from the massive moth flights of 1974, did not materialize.

The budworm was also a major problem in the Lake States. Michigan reported more than 370,000 acres defoliated. Some county surveys showed that 112,000 cords of spruce and fir have already been lost to this pest. Pockets of heavy mortality occurred on the Hiawatha National Forest in Upper Michigan, with the outbreak in northeastern Wisconsin continuing. About 60,000 acres were defoliated. Minnesota sustained heavy mortality, with budworm infestations in that state totalling about 100,000 acres in 1975 (Fig. 1).

There were a number of pilot control projects against the budworm in 1975. Insecticides tested include Sumithion,® Dylox,® Matacil,® Orthene® and Sevin® 4 Oil.[1] U. S. Forest Service projects indicate Dylox is 96 percent effective in reducing larval populations. Sumithion reduced larval populations by 87 percent, and Matacil by 80 percent. Results of the University of Maine's project showed Orthene 98 percent effective in reducing larval populations. Dylox provided 42 percent foliage protection, while Orthene gave 52 percent protection. A cooperative project between the U. S. Forest Service and the state of Minnesota showed budworms can be effectively controlled when either 1/2 or 1 lb. carbaryl/acre is applied.

The largest cooperative forest aerial spray project ever conducted by state and federal agencies in the United States was completed in June 1975. Approximately 2.2 million acres of spruce-fir forests in Aroostook, Piscataquis, Penobscot and Washington counties, in Maine, were sprayed with two applications of Sumithion at a rate of 19.2 oz./acre;

1 The use of trade, firm, or corporation names in this publication is for the information and convenience of the reader. Such use does not constitute an official endorsement or approval by the U. S. Department of Agriculture of any product or service to the exclusion of others which may be suitable.

one application of Sevin 4 Oil at 1 lb/acre; and one application of Zectran at 0.15 lb/acre. The project was at least 90 percent effective in reducing larval populations. Approximately 3,240 acres of spruce-fir plantations in nothern New York were sprayed using carbaryl at 1 lb/acre. Cygon 2E and malathion were tested against the budworm in northeastern Vermont.

Preliminary estimates indicate that about four million acres in Maine are being considered for possible spray application in 1976. Data from aerial surveys of damage, biological evaluations and benefit/cost analysis will influence the final acreage proposal.

No budworm projects outside of Maine are anticipated. Massive moth flights did not occur in 1975; therefore, budworm populations are expected to be down in remaining areas of New England and New York.

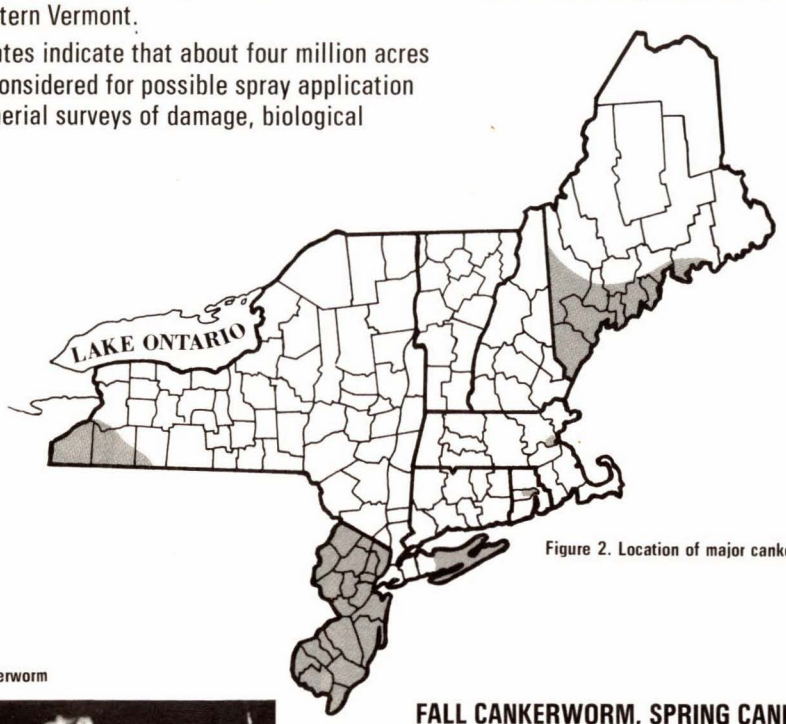
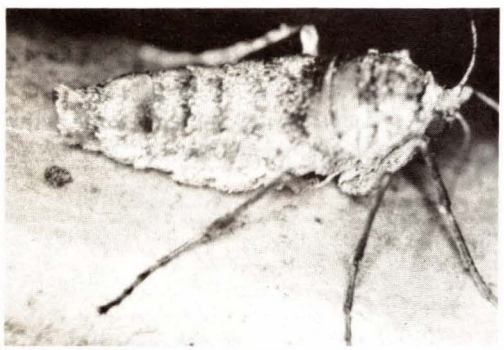


Figure 2. Location of major cankerworm infestations by counties, 1975.

Adult female of the fall cankerworm



Larval stage of the linden looper

FALL CANKERWORM, SPRING CANKERWORM, AND ASSOCIATED LOOPERS,

Alsophila pometaria (Harris)
and *Paleacrita vernata* (Peck)

Populations of cankerworms were found to be in outbreak proportions in most of the Northeastern Area in 1975. Infestations were reported in Indiana, Maryland, Massachusetts, Michigan, Minnesota, New Jersey, New York, Pennsylvania, Rhode Island, West Virginia and Wisconsin (Fig. 2). New York reported 93,000 acres, Pennsylvania 362,000 acres and Wisconsin 300,000 acres defoliated by the cankerworm complex. The linden looper was the predominant species associated with cankerworms in New York.

Approximately 4,000 acres were sprayed with Sevin 4 Oil in Massachusetts. Considerable spraying was also done by private individuals and communities in the Milwaukee, Wisconsin area and the Twin Cities area of Minnesota. Approximately 20,000 acres in Pennsylvania may have to be treated during 1976 to prevent economic losses in high use residential and recreation areas.

GYPSY MOTH,
Porthetria dispar (L.)

Gypsy moth populations in New York, New England and Pennsylvania declined significantly in 1975 (Table 2). The most dramatic decreases occurred in New England and New York, where total infested acreage dropped to about one-third of the 1974 figures. Among states with well-established infestations, only New Jersey showed an increase over 1974 activity (Fig. 3).

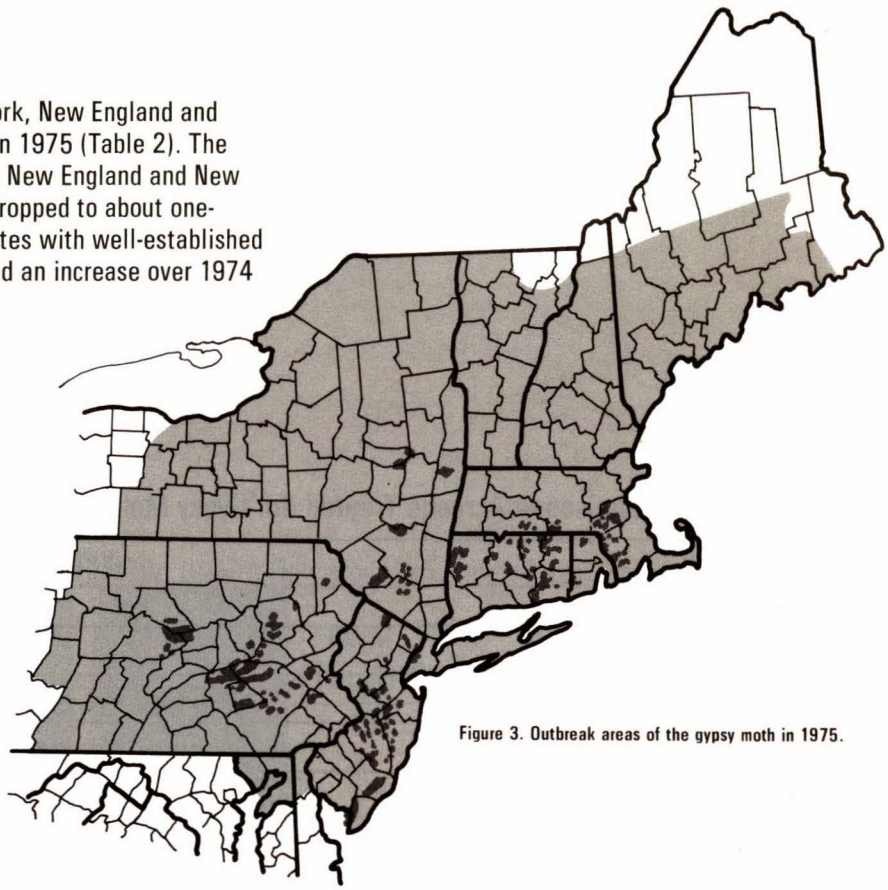


Figure 3. Outbreak areas of the gypsy moth in 1975.

TABLE 2—Area Defoliated By Gypsy Moth
(in Acres)

STATE	YEAR 1974	YEAR 1975	PERCENT CHANGE
Connecticut	120,980	63,411	−48
Maine	850	110	−87
Massachusetts	76,903	17,900	−77
New Hampshire	0	0	0
New Jersey	28,102	55,400	+49
New York	42,350	9,275	−78
Pennsylvania	479,590	317,800	−34
Rhode Island	2,120	435	−79
Vermont	0	30	—
TOTALS	750,895	464,361	−38

*During 1975, a total of 48,579 infested acres were treated in states shown in Table 3. Additional acreage was treated in the states of Michigan and Maryland as a part of the regulatory program.

TABLE 3—Comparison of Acreage Treated for Gypsy Moth in 1974 and 1975

	YEAR		PERCENT
STATE	1974	1975	CHANGE
New Jersey	69,744	13,175	−81
New York	23,000	2,904	−87
Pennsylvania	72,900	30,000	−58
Rhode Island	87,200	2,500	−97
TOTALS	252,844	48,579	−81

Disparlure-baited traps captured male moths in new counties of Michigan, Ohio, New York and Wisconsin. No moths were trapped during 1975 in Ohio in areas where treatments were applied in 1974 and earlier in the year. In Michigan, the number of moths trapped in 10 counties totaled 174 from 159 traps. This compares with 1,828 moths captured in 1,039 traps in 1973 (21 counties), and 495 moths captured in 436 traps in 1974 (9 counties). The number of moths in Cook County, Illinois, increased sharply. In 1974, only 12 moths were captured in Cook County as opposed to 191 in 1975. Nevertheless, intensive surveys in this area failed to reveal any egg masses.

Release of gypsy moth parasites continued on a large scale throughout much of the northeast. Over 2,675,000 parasites were released in Pennsylvania, New York, New Jersey, Rhode Island, West Virginia and Wisconsin. Species

of the genus *Apanteles* made up about 38 percent of the total number released.

Several biological pesticides were evaluated by the Gypsy Moth Development and Application Group located in Hamden, Connecticut. The biological materials included: Dimilin® 25WP, Dipel® SC, Thuricide® 16B and parasites. The Thuricide treatments, with and without parasites, and Dimilin provided significantly greater foliage protection than the other treatments (Table 4). The evaluation of Dimilin will continue in 1976.

Signs point to continued decline of gypsy moth populations in 1976.

TABLE 4—Effect of treatments on defoliation (White Oak group) expressed as percentages.

TREATMENT	NUMBER OF APPLICATIONS	PRESPRAY DEFOLIATION	FINAL DEFOLIATION	NET DEFOLIATION	FOLIAGE[1] PROTECTION
Dimilin	1	16	45	29	47
Dipel SC—1 qt./acre	1	13	65	52	24
Dipel SC—2 qt./acre	1	10	75	65	11
Thuricide 16B	2	8	30	22	54
Thuricide 16B & Parasitoids	2	10	45	35	41
Parasitoids	1	11	90	79	0
Control	—	14	90	76	—

1 Foliage protection—amount of foliage saved due to treatment when compared against control.

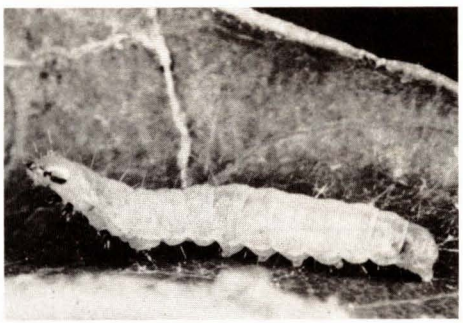
One of the members of the oak leaf roller complex, *Chionoides vernella*

OAK LEAF ROLLER,
Archips semiferanus (Walker)

The outbreak of this insect, which started in 1967, appears to be over. Only 1,700 acres were defoliated in Pennsylvania in 1975. It, however, left severe tree mortality over much of the outbreak area. In Pennsylvania, a survey of two out of three counties affected revealed a loss of 108 million board feet of sawtimber and 47 million cubic feet of pulpwood. The total value of wood destroyed was estimated at $3.2 million.

OAK LEAFTIER COMPLEX,
Croesia albicomana (Clemens), etc.

This complex defoliated approximately 3,000 acres in New Jersey, and populations appear to be increasing. Severe defoliation occurred on 3,000 acres of high-value red oak in Wisconsin, but populations are now on the decline. An oak leaf roller, *Sparganothis pettitana* (Robinson), defoliated 300 acres of sugar maple trees and several "sugar bushes" in northern Vermont. This is the first record of the insect in populations large enough to cause noticeable damage. Oak leaf tier populations in the rest of the northeast appear to be in a downward trend.



Larval stage of the oak leaftier

JACK PINE BUDWORM,
Choristoneura pinus Freeman

Populations dropped dramatically from last year's outbreak levels in Michigan. Only 35,000 acres of light to moderate defoliation was recorded in 1975. The heavy defoliation of 1974 resulted in a loss of 53 thousand cords of jack pine on two of the state forests surveyed. Wisconsin reported 50,000 acres with varying degrees of defoliation in 1975. Thuricide® 16B was tested against the jack pine budworm in northern Wisconsin and performed well.

FOREST TENT CATERPILLAR,
Malacosoma disstria Hübner

The forest tent caterpillar populations in Lower and Upper Michigan exploded, damaging over 200,000 acres. Heavy moth flights occurred in Upper Michigan on the Ottawa National Forest. About 6,000 acres of defoliation on lands of mixed ownership was reported in Indiana. Light infestations were detected in Vermont and New Hampshire.

LARGE ASPEN TORTRIX,
Choristoneaura conflictana (Walker)

Defoliation by the tortrix was reported in Minnesota, Vermont and Wisconsin. In Wisconsin, severe defoliation occurred in portions of two counties. Large moth flights in defoliated areas caused concern to local residents. Approximately 11,500 acres were severely defoliated in Vermont. This is the first recording of such a large infestation in that state. The Minnesota infestation declined to the point where defoliation was virtually undetectable from the air. Mortality, resulting from past defoliation by this insect, is beginning to occur on poor aspen sites.

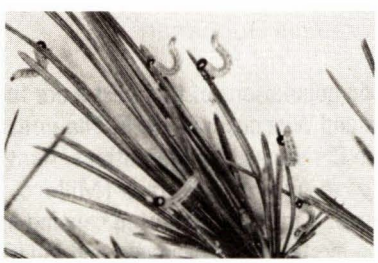
Nests of the fall webworm

FALL WEBWORM,
Hypantria cunea (Drury)

Fall webworm populations ranged from very light to heavy. Ohio, Wisconsin and Indiana experienced generally low population levels statewide. Illinois and Missouri reported generally moderate infestation levels, with West Virginia, New Jersey, New York and the New England area recording moderate to heavy activity. The fall webworm was heavy in southern Michigan, with black walnut the favored host.

ARBORVITAE LEAFMINER,
Argyresthia thuiella (Packard)

Populations of this insect exploded in the Lower Peninsula of Michigan during 1975. Defoliation, which was confined to only two counties in 1974, was noticeable in almost every part of the northern Lower Peninsula in 1975. An estimated 130,000 acres were damaged in Michigan. The outbreak is expected to continue at high levels in Michigan in 1976. The leafminer was also detected in areas of New Hampshire.


Larch sawfly larvae

LARCH SAWFLY,
Pristiphora erichsonii (Hartig)

The populations of this sawfly are increasing in Michigan, New York, Maine and Wisconsin, while others in Minnesota, New Jersey, Vermont and New Hampshire are decreasing. The parasite *Olesicampe benefactor* has been released in selected larch stands in Minnesota and New York.

LARCH CASEBEARER,
Coleophora laricella (Hübner)

This insect, along with the larch sawfly, defoliated 20,000 acres in New York. Vermont also reported several small infestations of this pest. Malathion was used at the William Putman Seed Orchard, Vermont, to control the casebearer. Populations are expected to increase in New York during 1976.

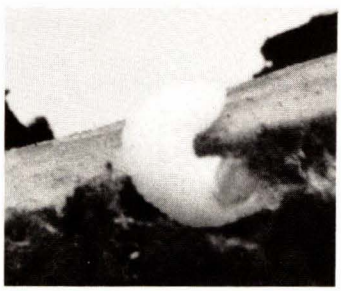
RED PINE SCALE,
Matsucoccus resinosae Bean and Godwin

A survey conducted last winter in New Jersey, revealed 31 residential properties and 1,015 trees were infested. In Connecticut, the infestation has spread rapidly to the north and east, with the following counties infested: Fairfield, New Haven, Litchfield, Hardford, Middlesex and New London. In New York, the infestation continues to spread northward causing mortality of red pine in Westchester, Putnam, Suffolk, Nassau and Orange counties. Long Island is also considered infested.

WHITE PINE WEEVIL,
Pissodes strobi (Peck)

Population levels are increasing in portions of southern Maine. High populations are also evident in New York and Vermont and are increasing in New Hampshire. Spraying has been done on an individual landowner basis in Maine to control this insect. Field tests of malathion, methoxychlor and dimethoate gave good protection to treated stands in Vermont. Approximately 200 acres of state land will be treated in New York this fall.

Larval stage of the white pine weevil



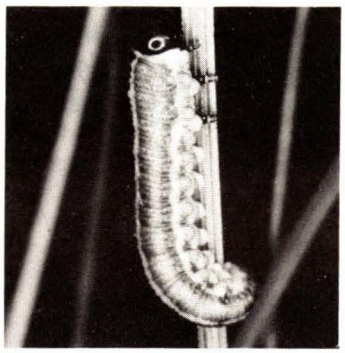
Larva of the pine root collar weevil

PINE ROOT COLLAR WEEVIL,
Hylobius radicis Buchanan

Damaging populations of this pest were found in Michigan, Minnesota and Wisconsin in 1975. The infestations were Scotch pine Christmas tree plantations. Another pine root weevil, *Hylobius rhizophagus* (Millers, Benjamin and Warner), was also reported causing higher-than-normal tree mortality in Wisconsin and Michigan.

CONIFER SAWFLIES

Only four sawfly species caused noticeable damage this year. The balsam-fir sawfly, *Neodiprion abietis* (Harris), is increasing in a wide area of Minnesota. As many as 50 colonies per tree were reported. The jack pine sawfly, *Neodiprion pratti banksianae* Rohwer, caused moderate defoliation of 5,000 acres in Upper Michigan. The red-headed pine sawfly, *Neodiprion lecontei* (Fitch), damaged several plantations in Michigan, West Virginia and Wisconsin. Scattered populations of the introduced pine sawfly, *Diprion similis* (Hartig), plagued Scotch, jack and white pine stands in Minnesota, Michigan and Wisconsin.



Larval stage of the European pine sawfly

Adult and gallery of *Ips pini*

BARK BEETLES,
Ips pini (Say)

Infestations occurred in scattered jack and red pine plantations found on lighter soils in northern Wisconsin. Bark beetle problems, associated with summer thinnings or timber sales, were higher than normal in Wisconsin and Michigan. This infestation was probably triggered by an extended period of hot, dry weather in July and August.

West Virginia personnel report a higher incidence of southern pine beetle this year.

SPITTLEBUGS,
Aphrophora parallela (Say)
and *A. saratogensis* (Fitch)

Nymphs were numerous and the conspicuous spittle masses of the pine spittlebug were found in Wisconsin, Michigan and Maine. Maine reports populations heavier in 1975, than over the last 10 years. Populations of the Saratoga spittlebug were high in Maine, northern Wisconsin and northern Michigan. About 85 acres of red pine were successfully treated in Wisconsin.

MISCELLANEOUS INSECTS

TIP MOTHS AND SHOOT MOTHS,
Rhyacionia spp.

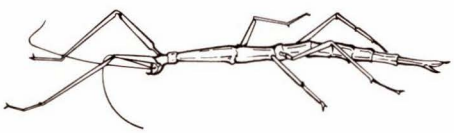
These insects were of concern in West Virginia, Indiana and Mossouri, where they attacked Scotch pine plantations. West Virginia and Missouri expect an increased damage in 1976.

THE ASIATIC OAK WEEVIL,
Cyrtepistomus castaneus (Roelofs)

Weevils defoliated about 1,000 acres in Pocahontas County, West Virginia. Damage was also evident throughout much of Missouri.

THE OAK DEFOLIATING GRASSHOPPER,
Dendrotettix quercus (Packard)

Spotty defoliation of scrub oak was caused in west central Wisconsin by this grasshopper. In Marienette County, Wisconsin, the grasshopper worked with walkingsticks to defoliate about 2,600 acres. Some damage was also recorded in Missouri.

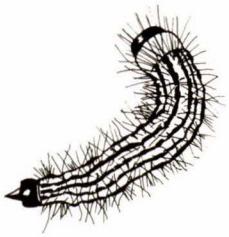


WALKINGSTICKS,
Diapheromera femorata (Say)

Forests in the Lake States, as well as in Missouri and West Virginia, were attacked. Defoliation was light to moderate throughout west central Wisconsin counties. In Minnesota, defoliation ranged from light to heavy in the central part of the state. West Virginia experienced heavy defoliation of black walnut, locust and oak in Mineral County. Moderate to heavy feeding took place in four Missouri counties. Sparse populations were also observed throughout several other southern Missouri counties.

LACE BUGS,
Corythucha spp.

High populations were reported attacking elm, oak and basswood in Minnesota and Wisconsin. The public expressed much concern since the browning symptoms of lace bug attack resemble those of Dutch elm disease and oak wilt.



DATANA CATERPILLARS

These insects were numerous in Illinois and West Virginia. The YELLOW NECKED CATERPILLAR, Datana ministra (Drury), caused heavy defoliation of pin oak in northern Illinois.

RED HUMPED OAKWORM,
Symmerista canicosta (Franclemont), and the
ORANGEHUMPED MAPLEWORM,
S. leucitys Franclemont

The damaging populations of these worms, which existed several years ago, have apparently collapsed. Heavy egg parasitism by *Telenomus* spp., and *Trichogramma* spp. is the main cause of the population decline.

HEMLOCK LOOPER,
Lambdina fiscellaria (Guenée)

An outbreak of this insect defoliated 400 acres of hemlock at two locations in Bradford County, Pennsylvania. The western Pennsylvania outbreak of *Lambdina athasaria athasaria* (Walker), that persisted for four years, collapsed over most of the area. Additional defoliation occurred on about 400 acres in eastern Pennsylvania.

CHERRY SCALLOP SHELL MOTH,
Hydria prunivorata (Ferguson)

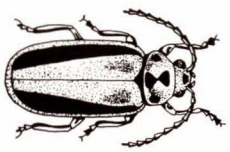
Populations in Pennsylvania have declined. Defoliation totaled less than 2,000 acres in north central Pennsylvania.

BALSAM WOOLLY APHID,
Adelges piceae (Ratzeburg)

Populations remained mostly static in New England, and the trend is expected to continue throughout 1976. About 18,000 acres were infested in northern Vermont. Aphid populations were low in New Hampshire with subsequently low fir mortality.

BIRCH LEAFMINER,
Fenusa pusilla (Lepeletier)

Locally heavy infestations were reported in Wisconsin, Michigan, Minnesota, West Virginia, Vermont, Rhode Island and New Hampshire.



ELM LEAF BEETLE,
Pyrrhalta lutcola (Muller)

This beetle was a pest in southern Michigan, throughout Missouri and in parts of Vermont. New Hampshire populations declined in one county and increased in three others. The Missouri infestations are expected to intensify in 1976.

LOCUST LEAFMINER,
Xenochalepus dorsalis (Thunberg)

Populations were very heavy in southeastern Ohio and southwestern and central West Virginia. Some light defoliation occured in southeastern Indiana.

MAPLE LEAFCUTTER,
Paraclemensia acerifoliella (Fitch)

In Vermont, the leafcutter caused serious concern when over 31,000 acres were defoliated. The defoliation, combined with drought, posed a threat to trees being tapped for maple syrup. Populations are increasing in New Hampshire and now cover several thousand acres. Localized infestations occurred in the northwestern Lower Peninsula of Michigan.

STATUS OF DISEASES

OAK WILT,
Ceratocystis fagacearum (Bretz) Hunt

For the second year, new infections were located in the northern Lower Peninsula of Michigan. The first oak wilt was reported on the Huron-Manistee National Forest. A survey of the Zumbro watershed in Minnesota revealed an annual loss of 25,000 board feet over a 1,500 acre area. The oak wilt situation in Missouri and Iowa appears to be static.

DUTCH ELM DISEASE,
Ceratocystis ulmi (Buism.) C. Mor.

This disease has been reported from every county in Michigan, Iowa, and in all but one county in Wisconsin. Heavy losses for 1976 are expected in Upper Michigan, northern Wisconsin and Minnesota. The state of Minnesota has authorized $800,000 for an elm tree removal program. In Michigan, cities with good sanitation and root graft control, reduced losses to very low levels. A trapping program using the phermone, Multilure, was conducted this summer on known Dutch elm disease locations on the Chequamegon, Nicolet and Ottawa National Forests. The only catch of the smaller European elm bark beetle was in Wisconsin on the Nicolet National Forest's Lakewood Ranger District.

CYTOSPORA CANKER OF ASPEN,
Cytospora chrysosperma (Pers.) Fr.

Cytospora canker has been reported on aspen stems in three northeastern Wisconsin counties. Many of the infected trees were dead or dying. Northern Michigan also reported a problem with cytospora canker. Most of the problems are confined to stressed areas.

DIPLODIA TIP BLIGHT,
Diplodia pinea, (Desm.)

This disease was found on dying red pine shoots at Griffith State Nursery in Wisconsin Rapids. Similar shoot mortality was also observed at the Hayward Nursery in Wisconsin, but the same causal fungus could not be isolated. Shoot mortality appears to be associated with root pruning operations. This tip blight has also caused damage to red pine in Minnesota. Stands in Long Island, New York, Martha's Vineyard, Massachusetts and New Jersey were also heavily damaged. In the coastal area, red and Austrian pine were the species affected.

CHESTNUT BLIGHT,
Endothia parasitica, (Murr.) A. & A.

The state of Minnesota is outside the original range of the American chestnut so it escaped the initial ravages of the blight. One of the few small plantations in that state is now infected. The trees have no resistance and are dying rapidly.

NECTRIA CANKER,
Nectria spp.

A Lake States survey by the U. S. Forest Service shows the disease to be a problem in a zone 15 miles wide and running along the Great Lakes shoreline.

SEPTORIA LEAF SPOT,
Septoria musiva Pk.

This leaf spot was common on balsam poplar throughout the Lake States, and was responsible for premature leaf drop in northern Michigan.

BUTTERNUT DIEBACK AND CANKER,
Cause unknown

Widespread dying of butternut was first reported in Wisconsin in 1967. The disease is also active in northeastern Iowa, where it attacks walnut.

DWARFMISTLETOE,
Arceuthobium pusillum Peck

Dwarfmistletoe continues to plague black spruce stands in the Lake States. A 1975 survey of the Chippewa National Forest showed a widespread distribution throughout the Forest, but so far it is of little economic importance.

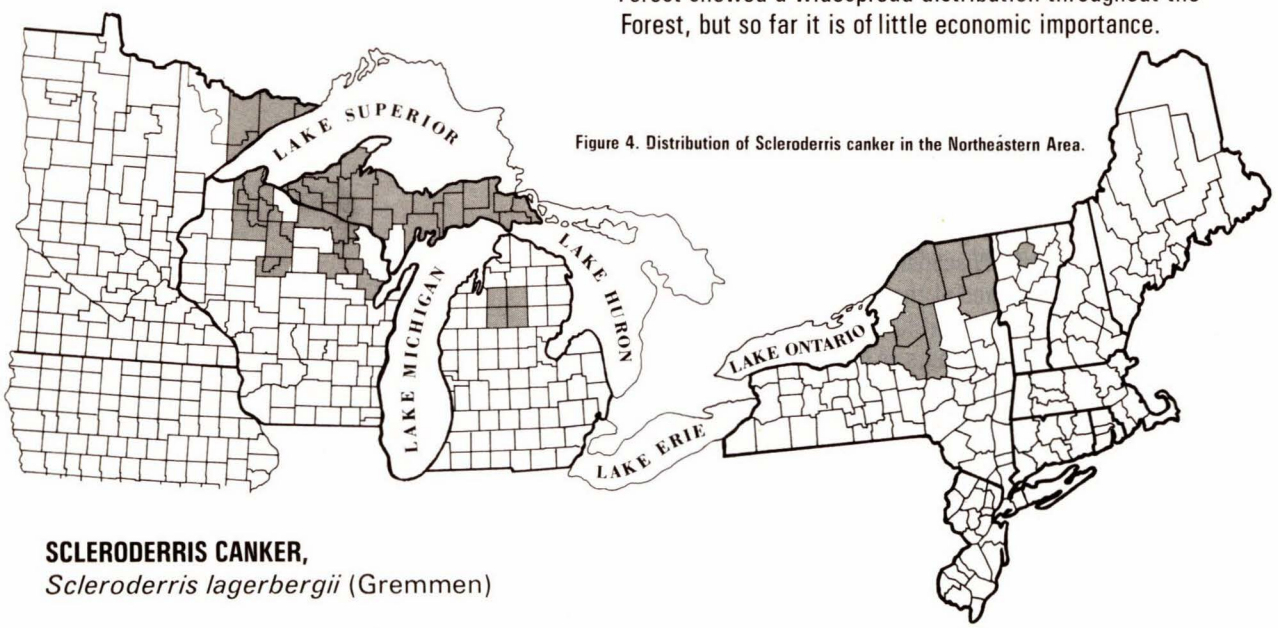


Figure 4. Distribution of Scleroderris canker in the Northeastern Area.

SCLERODERRIS CANKER,
Scleroderris lagerbergii (Gremmen)

New infections were reported on about 200 acres of young red pine in Luce County, Michigan. During 1975, red pine planting stock was shipped from Toumey Nursery to Lower Michigan. Because of past incidence of Scleroderris in Toumey Nursery, a survey was conducted to ensure that the disease had not been brought in on the stock. No Scleroderris was detected during the survey. Fungicide spray treatments at the nursery protected the seedlings against the disease. Many new infection centers appeared in northern New York. In Oneida, Lewis, and Franklin counties, extensive mortality is occurring in 40 year-old stands; all the hard pines in the Adirondack region are in jeopardy (Fig. 4).

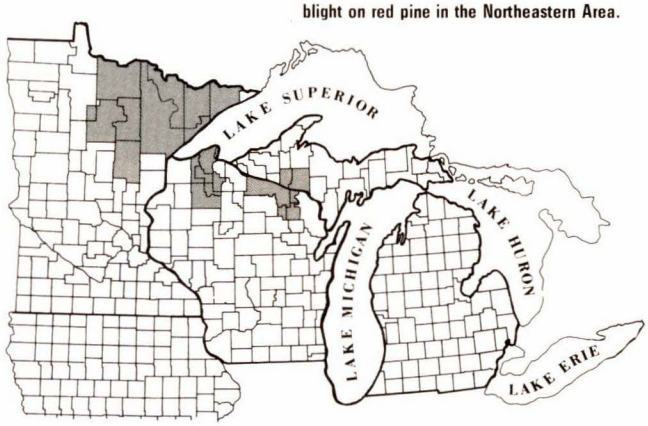
ANTHRACNOSE
Species of *Gnomonia, Gloeosporium, Marssonina,* and others

The overall incidence of anthracnose appeared less severe than in recent years. Michigan, Iowa, Indiana, Pennsylvania and Missouri reported widespread occurrance but it was not as severe as in the past.

WHITE PINE BLISTER RUST,
Cronartium ribicola Fisch

White pine blister rust continues to be a problem in the Lake States. A Bureau of Indian Affairs survey in northern Minnesota and Wisconsin showed most areas do not have enough stems per acre to justify pathological pruning. The Wisconsin Department of Agriculture pruned several areas in an effort to control blister rust.

Figure 6. Distribution of Sirococcus tip blight on red pine in the Northeastern Area.



BEECH BARK DISEASE
is caused by a combination of BEECH SCALES, *Crytococcus fagi* (Baer.) and *Xylococculus betulae* (Perg.), and a fungus *Nectria coccinea var. faginata* Loh., Wats. and Ay

Because of this complex, heavy beech mortality is found in Vermont wherever beech occurs in any quantity. The annual loss in this state exceeds 90 million board feet in large sawtimber stands. The disease incidence is heavy throughout stands in the Adirondack and Catskill Regions. A new infestation was found in Cattarauyus County, the western-most infestation yet known in New York. New Hampshire is experiencing heavy beech mortality in most of its beech stands. In Pennsylvania, Nectria has been observed along the eastern border of Tioga County—25 miles west of the previously known boundary. The known range of the complex in the northeast is shown on the following map (Fig. 5).

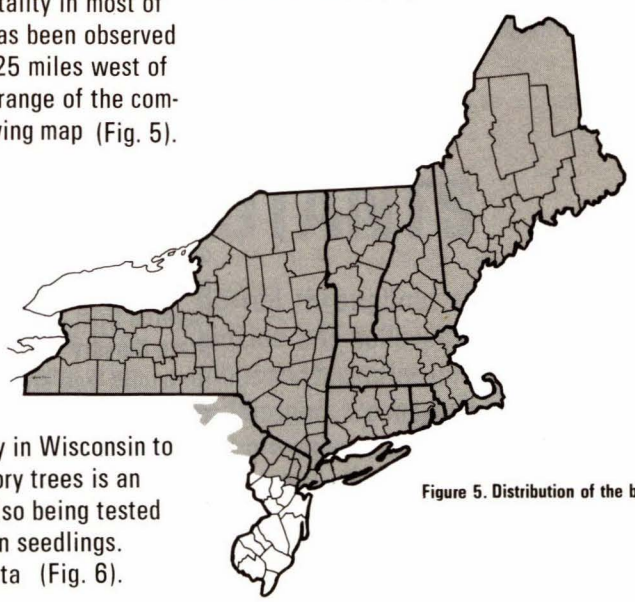


Figure 5. Distribution of the beech bark disease complex in the Northeastern Area.

RED PINE SHOOT BLIGHT,
Sirococcus strobilinus (Pruess)

Several cooperative studies are underway in Wisconsin to determine if the removal of infected overstory trees is an effective control measure. Fungicides are also being tested to determine if infection can be prevented in seedlings. One new infection was reported in Minnesota (Fig. 6).

WHITE PINE ROOT DECLINE,
Verticicadiella procera (Kend.)

This disease was reported in Iowa and Ohio plantations. It was observed for the first time in Pennsylvania, where it killed five percent of the trees in several plantations in Greene and Juniata counties.

BROWN SPOT NEEDLE BLIGHT,
Scirrhia acicola (Dearn.)

In Wisconsin, there were no new reports of brown spot infection in Scotch pine Christmas tree plantations and growers in the west central part of the state continued to spray previously infected plantations as a preventative measure. Brown spot threatened Scotch pine Christmas tree plantations in Missouri, where infections are serious enough to warrant control measures (Fig. 7).

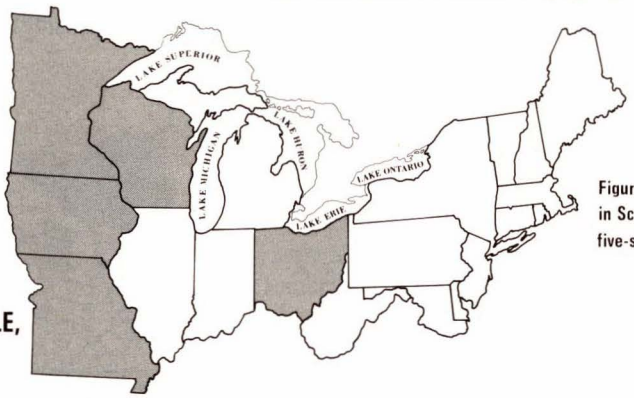


Figure 7. Brown spot has been reported in Scotch pine plantation in the five-shaded States in our Area.

VERTICILLIUM WILT OF MAPLE,
Verticillium spp.

This wilt was widespread in Iowa, Pennsylvania and southern Indiana, but is apparently no cause for serious concern. The disease seems to be the worst when coupled with drought, such as occurred in southern Indiana during 1975.

LOPHODERMIUM NEEDLE CAST,
Lophodermium pinastri (Schrad.) Chev.

This needle cast was widely reported throughout Wisconsin and eastern Pennsylvania. In Wisconsin, browning was noted on red pine sawtimber and pole-size trees, as well as on nursery seedlings in two counties. The disease was also isolated from 3-0 nursery stock grown at the F. G. Wilson State Nursery in Wisconsin. Since only three Scotch pine Christmas tree growers in Wisconsin treated for *Lophodermium* in 1975, the 1974 fungicide control program was considered successful. In Pennsylvania, the disease was widely scattered in several eastern counties and infected over 3,790 acres of pitch pine.

Indiana also reported incidence of *L. pinastri* on Scotch pine and spruce Christmas trees.

SWEETFERN RUST,
Cronartium comptoniae Arth.

Sweetfern rust was detected for the first time in Maryland. About 55 percent of the trees in a 440 acre loblolly pine plantation in Worchester County showed symptoms. Delaware reported a high incidence of sweetfern rust in north central Sussex County.

MYCORRHIZAL SURVEYS

A survey of two Federal nurseries in the Lake States showed approximately 20 to 25 percent of the feeder roots on the 3-0 red pine stock were mycorrhizal. Plans are to introduce mycorrhizal fungi into nursery beds in an attempt to increase the percentage of feeder roots that are mycorrhizal.

PINE SEEDLING MORTALITY,
cause unknown

An unusual mortality of nursery red pine stock outplanted from the Eveleth Nursery, Minnesota, was noted during 1975. The North Central Forest Experiment Station is conducting a research project of this problem. High mortality occurred of jack pine stock outplanted this fall in Lower Michigan. About 40 to 120 acres may be involved.

PYTOPHTHORA ROOT ROT,
Phytophthora citricola Sawada Sensu Waterhouse

This fungus cased heavy mortality at the Jasper-Pulaski State Nursery in Indiana. Over 50 percent of the black walnut seedlings were killed.

ATMOSPHERIC POLLUTANTS

A needle blight of white pine, possibly caused by SO_2 or O_3, was conspicuous in central Wisconsin. About five to ten percent of plantation trees were affected in Columbia, Green, Green Lake, Marquette and Waushara counties. This condition was also apparent in a 10 to 15 square mile area in portions of Clarks and Wood Counties. Similar symptoms on white pine were reported throughout the Lake States. Sulfur dioxide was believed responsible for damage to pines and hickories throughout a 1,200 acre area in Missouri. Pennsylvania reported air pollution to be widespread, but not as noticeable as last year. White pine has shown pollution damage in various areas of New England for several years. Ozone is the causal pollutant.

ANIMAL DAMAGE

Pine meadow vole populations caused severe damage in Scotch and red pine plantations in most north central Wisconsin counties. It is estimated that several million trees were lost. Approximately 30,000 Scotch pine were destroyed by mice in Vermont this past winter. Starling excrement caused chlorosis and terminal damage of winter pine in a small area of southern Pennsylvania.

PHYSIOLOGICAL DISORDERS

Needle droop, a physiological problem caused by water leaving the current year's needles faster than it can be absorbed by the roots, was found throughout northern Wisconsin, Michigan and Minnesota. The problem was most pronounced on red pine. Iron chlorosis was widespread on white oak in northeastern Iowa and parts of southern Minnesota and Wisconsin.

SUMMARY

The insect defoliators held the limelight in 1975. Three defoliators—spruce budworm, gypsy moth and fall cankerworm—defoliated over 8.5 million acres of forested land. An oak leaf roller outbreak which had plagued oak stands in Pennsylvania for several years is apparently over. It left in its wake, an estimated 3.2 million dollar loss of wood. There appears to be a glimmer of hope, however, in the management of the gypsy moth. Several biological materials, including a virus and insect growth regulator, appear to be close to registration. This is in addition to *Bacillus thuringiensis,* a bacterium which is already registered for a number of insect pests.

Several diseases caused noticeable losses during the past year. Dutch elm disease losses were heavy in northern Wisconsin, Upper Michigan, and Minnesota. Remote sensing surveys on National Forest land are locating disease hot spots, so salvage operations can be accelerated. The beech bark disease complex continues to expand through New York and Pennsylvania. In Vermont alone, the annual loss is estimated to be 90 million board feet. This loss of wood would be enough for about 9,000 new homes. In New York State, Scleroderris canker is causing extensive damage in hard pine stands in the Adirondack region. The disease in New York is affecting pine of all ages, whereas, in the Lake States it is a seedling problem. Studies on red pine shoot blight indicate that it can be controlled silviculturally.

For more information concerning forest pest problems
in your state contact:

CONNECTICUT:
John Anderson, State Entomologist
Connecticut Agricultural Experiment Station
123 Huntington Street
New Haven, CT 06511
Phone: 203-787-2421, Ext. 72

DELAWARE:
Walter F. Gable
State Forester
Box D
Dover, DL 19901
Phone: 302-678-4820

ILLINOIS:
James A. Appleby
Associate Entomologist
Section of Economic Entomology
163 Natural Resources Building
Urbana, IL 61801
Phone: 217-333-6888

INDIANA:
Philip T. Marshall, FPC Specialist
Indiana Department of Natural Resources
Vallonia State Nursery
Vallonia, IN 47167
Phone: 812-358-3621

IOWA:
Roy Hatcher
Iowa State Conservation Commission
300 Fourth Street
Des Moines, IA 50319
Phone: 515-863-5760

MAINE:
Richard Dearborn, Survey Entomologist
Maine Forest Service
Entomology Laboratory
50 Hospital Street
Augusta, ME 04330
Phone: 207-289-2791

MARYLAND:
Charles Dull
Entomologist Trainee
Maryland Department of Agriculture
Division of Plant Industry
College Park, MD 20742
Phone: 301-658-6620

MASSACHUSETTS:
Stanley Hood, Chief
Bureau of Insect Pest Control
Division of Forests and Parks
Department of Natural Resources
100 Cambridge Street
Boston, MA 02202
Phone: 617-727-3184

MICHIGAN:
Daniel Mosher, Entomologist
Michigan Department of Natural Resouces
Stevens T. Mason Building
Lansing, MI 48926
Phone: 517-253-1275

MINNESOTA:
Jerry Hecht, Entomologist
Department of Natural Resources
658 Cedar Street
St. Paul, MN 55155
Phone: 612-296-4488

MISSOURI:
Ramon D. Gass, FPC Specialist
Missouri Conservation Department
Forestry Division
Jefferson City, MO 65101
Phone: 314-751-4115

NEW HAMPSHIRE:
Alfred Avery, Chief
Division of Forests and Lands
Department of Resources and Environmental Development
P.O. Box 896, State House Annex
Concord, NH 03301
Phone: 603-271-3457

NEW JERSEY:
Robert Fringer, Chief
Bureau of Entomology
John D. Kegg, Entomologist
New Jersey Department of Agriculture
Trenton, NJ 08625
Phone: 609-599-3511

NEW YORK:
E. G. (Bud) Terrell, Principal Forester
Bureau of Forest Insect and Disease Control
Department of Environmental Conservation
Albany, NY 12201
Phone: 518-547-3620

OHIO:
Larry Ehlers, Staff Forester
Division of Forests and Preserves
Department of Natural Resources
Fountain Square
Columbus, OH 43224
Phone: 614-942-7842

PENNSYLVANIA:
James O. Nichols, Chief Entomologist
Pennsylvania Department of Environmental Resources
Bureau of Forestry, Division of FPM
34 Airport Drive
West Middletown, PA 17057
Phone: 717-637-2703

RHODE ISLAND:
Rudy D'Andrea, Chief
Division of Agriculture
Veteran's Memorial Building
83 Park Street
Providence, RI 02903
Phone: 401-277-2781

VERMONT:
H. Brenton Teillon, Chief
Forest Resource Protection
Agency of Environmental Conservation
Department of Forests and Parks, State House
Montpelier, VT 06502
Phone: 802-832-3375

WEST VIRGINIA:
Albert E. Cole, Director
Plant Pest Control Division
West Virginia Department of Agriculture
Charleston, WV 25305
Phone: 304-885-2788

WISCONSIN:
Donald Rendlund
Wisconsin Department of Natural Resources
3911 Fish Hatchery Road, Route 4
Madison, WI 53711
Phone: 608-366-2428

1.

Photographs of early gypsy moth history taken from:

Forbush, A.T.and C.H. Fernald • 1896. The gypsy moth. Wright and Potter Printing Company. Boston, Mass. 607p.

2.

3.

4.

5.

1. The Trouvelet house in Medford, Mass., where the French naturalist conducted his experiments with silk-worms. From here, it escaped to become a major threat to hardwood forests of northeastern United States.
2. View of Myrtle Street in Medford, Mass. showing the locality of the first outbreak which occurred in 1889.
3. Early spray apparatus used against the gypsy moth. Paris green and arsenate of lead were the first insecticides to be used.
4. Men working to destroy the egg masses by pruning and scraping. After working several days on the tree it was reported free of gypsy moth eggs. Another group of workers subsequently found 600 egg masses on the tree. Despite their effort to exterminate the insect from the tree, it had to be sprayed that spring.
5. Cutting and burning was thought to be an extermination method for the gypsy moth. They also recommended burning the area again in the spring to kill the young caterpillars.

☆ U.S. GOVERNMENT PRINTING OFFICE, 1976; 653-516